

09/965,545

01AB121

REMARKS

Claims 1-8, 12-22, and 24-42 are currently pending in the subject application and are presently under consideration. Claims 1, 5, 19, 22, and 36 have been amended herein. A marked-up version of claim amendments made herein is found on pages 2-8 of this Reply.

Favorable reconsideration of the subject patent application is respectfully requested in view of the comments and amendments herein.

I. Objections to Claims 1 and 5

Claims 1 and 5 are objected to for minor informalities. Applicants' representative appreciates the Examiner's comments regarding the subject informalities, which have been corrected herein in accordance with the Examiner's suggestions. Therefore, it is respectfully requested that this objection be withdrawn.

II. Rejection of Claims 1, 19, and 22 Under 35 U.S.C. §102(e)

Claims 1, 19, and 22 stand rejected under 35 U.S.C. §102(e) as being anticipated by McConnell *et al.* (U.S. 6,002,232). Withdrawal of this rejection is respectfully requested for at least the following reasons. McConnell *et al.* does not disclose each and every aspect of the present invention as set forth in the subject claims.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ 2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the...claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

The present invention relates to systems and methods for controlling and diagnosing the health of a machine, and more particularly, to systems and methods for controlling and diagnosing motorized systems according to vibration, pressure, temperature, speed, and/or current analysis. Independent claim 1 has been amended to recite "A method for controlling a motorized system comprising: measuring an attribute

09/965,545

01AB121

of the motorized system, the attribute comprises at least one of vibration, speed, temperature, pressure, and current in the motorized system; diagnosing a health of the motorized system based on the measured attribute; providing a diagnostics signal based on the diagnosed health; prognosing a state of the motorized system based at least in part on the at least one sensed attribute and/or the diagnosed state; providing a control signal based at least in part on the diagnosed health and the prognosed state; *and providing a feedback operation that adjusts the control signal to extend the lifetime of the motorized system to a specific time horizon.*" Independent claims 19 and 22 have been amended to recite similar aspects. The subject specification is replete with support for the amendment: for instance, according to an example described at pages 24-25, "...an appropriate control signal 64 may be provided by the controller 71 to the motor drive 60 in order to avoid anticipated cavitation, based on the diagnostics signal 72 (e.g., and/or the setpoint 19), whereby the service lifetime of one or more system components (e.g., pump 14) may be extended. The control signal 64 can further be provided to reduce cavitation to a prescribed low level to meet process constraints and to extend machinery lifetime to a specific time horizon (e.g., to allow for mission completion)." (Page 24, line 26 – page 25, line 3.) Moreover, "Subsequent diagnostics on the system with modified control can confirm, in a feedback operation...whether a new, extended operating lifetime will be obtained." (Page 4, lines 20-23.) McConnell *et al.* does not describe such claimed aspects of the subject invention.

McConnell is directed toward suppressing vibration in a physical system via analysis of frequency spectra of a command input that is selected according to various parameters. The examiner contends that McConnell *et al.* describes the claimed aspect of "prognosing a state of the motorized system based at least in part on the diagnosed state," citing column 8, lines 42-50. However, the Examiner's cited section discusses selecting a command signal and evaluating a noise generation potential there for based on analysis of a table lookup of a frequency spectrum for the command signal, upon which aspect it appears the Examiner relies to describe prognosing a state of the system. If the analysis of the command signal attributes is satisfactory, then the command signal is applied to the system. Only *after* application of the command signal does McConnell *et al.* employ any diagnostic action. Thus, McConnell does not disclose *prognosing a state of a motorized system based on a diagnosed state of the system*, but rather discusses

09/965,545

01AB121

employing a predicted value as determined from a table lookup to select a command signal that can be applied to a system to be diagnosed subsequently.

Additionally, McConnell *et al.* is silent with regard to the aspect of “a feedback operation that adjusts the control signal to extend the lifetime of the motorized system to a specific time horizon,” as set forth in the amended independent claims. Nowhere in the Examiner’s cited sections or otherwise does McConnell *et al.* even mention a feedback operation that adjusts a control signal to control system lifetime duration.

In view of the foregoing, it is readily apparent that McConnell *et al.* does not anticipate or make obvious the applicant’s invention as recited in the subject claims. Therefore, this rejection should be withdrawn.

III. Rejection of Claims 36-38, 40, and 41 Under 35 U.S.C. §102(e)

Claims 36-38, 40, and 41 stand rejected under 35 U.S.C. §102(e) as being anticipated by Madhavan (U.S. 6,004,017). Withdrawal of this rejection is respectfully requested for at least the following reasons. Madhavan does not disclose each and every aspect of the present invention as set forth in the subject claims.

Independent claim 36 has been amended herein to set forth “a diagnostics system that diagnoses a state of the motorized system based at least in part on the at least one sensed attribute; a prognostic system that makes a prognosis of the motorized system based at least in part on the at least one sensed attribute, the diagnosed state, or both; and a controller that controls the motorized system based at least in part on the diagnosed state; the diagnostics system further performs at least a second diagnosis of the state of the motorized system after corrective action is taken by the control component and ensures that the motorized system will function until a predetermined time horizon is reached.” Support for the amendment can be found at, for example, Page 4, lines 20-23, and Page 24, line 26 – Page 25, line 3, as discussed *supra* with respect to Section II. Madhavan fails to disclose such aspects of the subject claims.

Madhavan merely discloses an algorithm for *predicting or avoiding* an episode of “chatter” in a machining tool. Chatter is a “self-excited relative vibration between the workpiece and the cutting tool in common machining processes such as turning processes on a lathe...” (Column 1, lines 30-33.) Madhavan does not disclose *a diagnostics system*

09/965,545

01AB121

that performs at least a second diagnosis and ensures that a motorized system will function for a predetermined time period as set forth in the subject independent claim.

Thus, Madhavan fails to anticipate or make obvious applicants' invention as set forth in independent claims 36 (and claims 37-38, and 40-41, which depend respectively there from). This rejection should be withdrawn.

IV. Rejection of Claims 1-5, 18-22, 24, 30, and 35 Under 35 U.S.C. §103(a)

Claims 1-5, 18-22, 24, 30, and 35 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Madhavan (U.S. 6,004,017) in view of McConnell *et al.* (U.S. 6,002,232). This rejection should be withdrawn for at least the following reasons.

Neither Madhavan nor McConnell *et al.*, alone or in combination, teach or suggest all of the claimed aspects of the present invention as set forth in the subject claims.

To reject claims in an application under §103, an examiner must establish a *prima facie* case of obviousness. A *prima facie* case of obviousness is established by a showing of three basic criteria. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) *must teach or suggest all the claim limitations*. See MPEP §706.02(j). *The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure*. See *In re Vaack*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) (emphasis added).

As discussed above with reference to Section II, independent claims 1, 19, and 22 have been amended herein to set forth the aspect of *a feedback operation that adjusts a control signal to manipulate system lifetime duration*. Support for this amendment is found in the subject specification at, for instance Page 4, lines 20-23, and Page 24, line 26 – Page 25, line 3. Neither of the Examiner's cited references teaches or suggest such aspect of the claimed invention, as discussed above in Sections II and III.

09/965,545

01AB121

Accordingly, it is readily apparent that neither Madhavan nor McConnell *et al.*, alone or in combination, teach or suggest all of the claimed aspects of independent claims 1, 19, and 22 (and claims 2-5, 18, 20-21, 24, and 30, which depend respectively there from). Withdrawal of this rejection is respectfully requested.

V. Rejection of Claims 6-8, 12-14, and 25-29 Under 35 U.S.C. §103(a)

Claims 6-8, 12-14, and 25-29 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Madhavan (U.S. 6,004,017) in view of McConnell *et al.* (U.S. 6,002,232) and further in view of Hays *et al.* (U.S. 6,260,004). Withdrawal of this rejection is respectfully requested for at least the following reasons. Neither Madhavan nor McConnell *et al.* nor Hays *et al.*, alone or in combination teach or suggest the present invention as set forth in the subject claims.

Claims 6-8, 12-14, and 25-29 depend respectively from independent claims 1 and 22. As set forth above with regard to Sections II-IV, independent claim 1 has been amended herein to set forth the aspect of "a feedback operation that adjusts the control signal to extend the lifetime of the motorized system to a specific time horizon." Claim 22 has been similarly amended herein. Neither Madhavan nor McConnell *et al.* teaches or suggests this aspect of applicants' claimed invention.

Hays *et al.* fails to overcome the deficiencies of Madhavan and McConnell *et al.* with respect to this aspect of the subject independent claims. Specifically, Hays *et al.* does not teach or suggest employing feedback to alter duration of system lifetime, such as to extend system function through a predetermined time horizon. In view of such, this rejection should be withdrawn.

VI. Rejection of Claims 15-17, and 31-34 Under 35 U.S.C. §103(a)

Claims 15-17 and 31-34 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Madhavan (U.S. 6,004,017) in view of McConnell *et al.* (U.S. 6,002,232) and further in view of Edison *et al.* (5,586,305). Withdrawal of this rejection is respectfully requested for at least the following reasons. Neither Madhavan nor McConnell *et al.* nor Edison *et al.*, alone or in combination, teach or suggest the present invention as set forth in the subject claims.

09/965.545

01AB121

Claims 15-17 and 31-34 depend from independent claims 1 and 22 respectively. As discussed above in Sections II-IV, neither Madhavan nor McConnell *et al.* teach or suggest **"a feedback operation that adjusts the control signal to extend the lifetime of the motorized system to a specific time horizon"** as set forth in independent claims 1 and 22. Edison *et al.* fails to overcome the deficiencies of Madhavan and McConnell *et al.* with respect to the subject independent claims.

In view of the above comments, it is respectfully submitted that the combination of Madhavan, McConnell *et al.*, and Edison *et al.* does not make obvious the subject invention as recited in independent claims 1 and 22 (and claims 15-17 and 31-34 which respectively depend there from). Therefore, this rejection should be withdrawn.

VII. Rejection of Claim 39 Under 35 U.S.C. §103(a)

Claim 39 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Madhavan (U.S. 6,004,017) in view of Grayson *et al.* (U.S. 5,111,531). Withdrawal of this rejection is respectfully requested for at least the following reasons. Claim 39 depends from independent claim 36, which, as discussed above in Section III, is not made obvious by Madhavan. Grayson *et al.* fails to overcome the deficiencies of Madhavan with respect to independent claim 36. Specifically, Grayson *et al.* does not teach or suggest a diagnostics system that **"ensures that the motorized system will function until a predetermined time horizon is reached."**

Accordingly, this rejection should be withdrawn.

VIII. Rejection of Claim 42 Under 35 U.S.C. §103(a)

Claim 42 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Madhavan (U.S. 6,004,017) in view of Hays *et al.* (6,260,004). Withdrawal of this rejection is respectfully requested for at least the following reasons. Neither Madhavan nor Hays *et al.*, alone or in combination, teach or suggest the present invention as set forth in the subject claim.

Claim 42 depends from independent claim 36, which is not made obvious by Madhavan, as discussed in Section III above. Hays *et al.* fails to overcome the deficiencies of Madhavan with respect to independent claim 36. Therefore, it is respectfully submitted that this rejection should be withdrawn.

09/965,54501AB121**CONCLUSION**

The subject application is believed to be in condition for allowance in view of the above comments and amendments. A prompt action to such end is earnestly solicited.

In the event any fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063.

Should the Examiner believe a telephone interview would be helpful to expedite favorable prosecution, the Examiner is invited to contact applicants' undersigned representative at the telephone number listed below.

Respectfully submitted,

AMIN & TUROCY, LLP



Himanshu S. Amin

Reg. No. 40,894

AMIN & TUROCY, LLP
24TH Floor, National City Center
1900 E. 9TH Street
Cleveland, Ohio 44114
Telephone (216) 696-8730
Facsimile (216) 696-8731